

REMARKS

Introduction

In response to the Office Action dated August 21, 2007, Applicants have amended claim 1. Support for amended claim 1 is found in, for example, pg. 10, line 19-pg. 11, line 5; pg. 24, lines 6-11; and pg. 26, lines 4-21. Care has been taken to avoid the introduction of new matter. In view of the foregoing amendments and the following remarks, Applicants respectfully submit that all pending claims are in condition for allowance.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over DE 3300865 to Puetter (hereinafter DE '865) in view of U.S. Patent No. 5,435,830 to Senda et al. (hereinafter Senda). Amended claim 1 recites, in part, “...**subjecting a solution containing tetravalent titanium ions** having a pH of not more than 7 to cathode electrolytic treatment to **reduce parts of the tetravalent titanium ions to trivalent titanium ions, to obtain a reducing agent solution containing both the trivalent titanium ions and the tetravalent titanium ions at a predetermined existing ratio.**”

The Office Action asserts that DE '865 teaches an aqueous TiCl_3 solution that is made by cathodic electrolytic reduction of TiCl_4 solution in a cell.

Turning to the prior art, DE '865 discusses a method of forming a thin film by using the TiCl_3 solution as a reducing agent to deposit a metal ion. DE '865 is *silent* regarding a tetravalent titanium ion solution and reducing parts of the tetravalent titanium ions to trivalent titanium ions. DE '865 fails to disclose or suggest, at a minimum, “...**subjecting a solution containing tetravalent titanium ions** having a pH of not more than 7 to cathode electrolytic

treatment to reduce parts of the tetravalent titanium ions to trivalent titanium ions, to obtain a reducing agent solution containing both the trivalent titanium ions and the tetravalent titanium ions at a predetermined existing ratio; and adding a water-soluble compound of at least one type of metal element forming the fine metal powder to the reducing agent solution, followed by mixing, to reduce and deposit ions of the metal element by the reducing action at the time of oxidation of the trivalent titanium ions to the tetravalent titanium ions to grow the fine metal powder, and at the same time, to restrain the growth of the fine metal powder by the tetravalent titanium ions, thereby to obtain a fine metal powder having a particle diameter corresponding to the existing ratio of the trivalent titanium ions and the tetravalent titanium ions,” as recited in amended claim 1.

The Office Action acknowledges that DE ‘865 does not explicitly teach producing fine metal powder. The Office Action relies on Senda in an attempt to cure the deficiencies of DE ‘865.

The Office Action asserts that Senda discloses the same TiCl_3 - TiCl_4 oxidation-reduction process as the instant invention using the same materials to produce fine metal powders.

Senda describes that TiCl_3 is added to an aqueous solution of a water-soluble compound of a metallic or non-metallic salt to produce a fine powder of metal by reducing TiCl_3 . Senda discusses a reducing agent solution containing trivalent titanium ions, not a solution of both trivalent and tetravalent titanium ions. Senda is *silent* regarding reducing parts of the tetravalent titanium ions to trivalent titanium ions. Thus, Senda fails to disclose or suggest, at a minimum, “...subjecting a solution containing tetravalent titanium ions having a pH of not more than 7 to cathode electrolytic treatment to reduce parts of the tetravalent titanium ions to trivalent titanium ions, to obtain a reducing agent solution containing both the trivalent titanium

ions and the tetravalent titanium ions at a predetermined existing ratio; and adding a water-soluble compound of at least one type of metal element forming the fine metal powder to the reducing agent solution, followed by mixing, to reduce and deposit ions of the metal element by the reducing action at the time of oxidation of the trivalent titanium ions to the tetravalent titanium ions to grow the fine metal powder, and at the same time, to restrain the growth of the fine metal powder by the tetravalent titanium ions, thereby to obtain a fine metal powder having a particle diameter corresponding to the existing ratio of the trivalent titanium ions and the tetravalent titanium ions,” as recited in amended claim 1.

Therefore, Senda does not cure the deficiencies of DE ‘865. Neither DE ‘865 nor Senda, individually or combined, disclose or suggest, “...subjecting a solution containing tetravalent titanium ions having a pH of not more than 7 to cathode electrolytic treatment to reduce parts of the tetravalent titanium ions to trivalent titanium ions, to obtain a reducing agent solution containing both the trivalent titanium ions and the tetravalent titanium ions at a predetermined existing ratio; and adding a water-soluble compound of at least one type of metal element forming the fine metal powder to the reducing agent solution, followed by mixing, to reduce and deposit ions of the metal element by the reducing action at the time of oxidation of the trivalent titanium ions to the tetravalent titanium ions to grow the fine metal powder, and at the same time, to restrain the growth of the fine metal powder by the tetravalent titanium ions, thereby to obtain a fine metal powder having a particle diameter corresponding to the existing ratio of the trivalent titanium ions and the tetravalent titanium ions,” as recited in amended claim 1.

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over DE ‘865 in view of Senda, and further in view of U.S. Patent No. 5,409,581 to Harrison et al. (hereinafter Harrison). The Office Action acknowledges that DE ‘865 does not explicitly teach that the

solution contains the tetravalent titanium ion after the deposition of the fine metal powder is reproduced as the reducing agent solution by the cathode electrolytic treatment and is repeatedly used for producing the fine metal powder. The Office Action relies on Harrison in an attempt to cure the deficiencies of DE '865.

The Office Action asserts that Harrison teaches a tetravalent titanium electrolyte and trivalent titanium reducing agent obtained thereby.

Harrison discloses converting tetravalent titanium into trivalent titanium. However, Harrison fails to disclose that a fine metal powder is produced using the claimed reducing agent solution.

None of the references, individually or combined, disclose or suggest, "...subjecting a solution containing tetravalent titanium ions having a pH of not more than 7 to cathode electrolytic treatment to reduce parts of the tetravalent titanium ions to trivalent titanium ions, to obtain a reducing agent solution containing both the trivalent titanium ions and the tetravalent titanium ions at a predetermined existing ratio; and adding a water-soluble compound of at least one type of metal element forming the fine metal powder to the reducing agent solution, followed by mixing, to reduce and deposit ions of the metal element by the reducing action at the time of oxidation of the trivalent titanium ions to the tetravalent titanium ions to grow the fine metal powder, and at the same time, to restrain the growth of the fine metal powder by the tetravalent titanium ions, thereby to obtain a fine metal powder having a particle diameter corresponding to the existing ratio of the trivalent titanium ions and the tetravalent titanium ions," as recited in amended claim 1.

Dependent claim 6 is allowable for at least for the same reasons as independent claim 1, and further distinguishes the claimed method of producing a fine metal powder.

Withdrawal of the foregoing rejections is respectfully requested.

Conclusion

In view of the above amendments and remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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